

US-PAT-NO: 6581176

DOCUMENT-IDENTIFIER: US 6581176 B1

TITLE: Method for transmitting control frames and user data frames in mobile radio communication system

DATE-ISSUED: June 17, 2003

INVENTOR-INFORMATION:

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US-CL-CURRENT: 714/749, 370/320, 370/474

ABSTRACT:

In a method for transmitting radio link protocol frames in a mobile radio communication system, if an error occurs on a radio section when user data frames of a radio link protocol (RLP) having respective different series numbers are transferred from a transmitting station to a receiving station, at least one missed user data frame is caused at the receiving station. At this time, the receiving station transmits, repeatedly by first times, a negative acknowledgement (NAK) control frame of the RLP for at least one missed user data frame, to the transmitting station. The transmitting station sends, by second times different from the first times, at least one missed user data frame in response to the received NAK control frame, to the receiving station. Particularly, series numbers of respective missed user data frames are sent through one NAK control frame to the transmitting station, at equal time when a timer for an NAK is expired, to accordingly result in reducing the number of the total NAK control frames and increasing a throughput per unit time.

29 Claims, 7 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 5

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Application Filing Date - AD (1):  
19981231

Claims Text - CLTX (1):

1. A method for transmitting radio link protocol frames in a mobile radio communication system, comprising: transferring user data frames of a radio link protocol (RLP) from a transmitting station to a receiving station, said user data frames having respective different series numbers; transmitting a negative acknowledgment (NAK) control frame of the radio link protocol a first prescribed number of times from the receiving station to the transmitting station when an error occurs in transmitting said user data frames so at least one missed user data frame occurs, the NAK control frame including a NAK sequence number corresponding to the first prescribed number of times and a retransmission number indicating a number of retransmissions of the at least one missed user data frame, where the retransmission number is variably selected for each NAK control frame; and sending at least one missed user data frame a second prescribed number of times in response to said NAK control frame from the transmitting station to the receiving station in accordance with at least one of a forward communication quality and a reverse communication quality, wherein the second prescribed number is equal to the number indicating a number of retransmissions.

Claims Text - CLTX (15):

15. A method for transmitting RLP frames in a mobile radio communication system, comprising: transmitting user data frames having series numbers from a transmitting station to a receiving station; transferring at least one negative acknowledgement (NAK) control frame for user data frames having non-received series numbers from the receiving station to the transmitting station; operating a timer for said NAK control frames transmitted, in the receiving station, said timer being for a NAK; sending one NAK control frame a first prescribed number of times for a missed user data frame or missed user data frames, which is/are not received until said timer is expired, from the receiving station to the transmitting station, said NAK control frame comprising (A) a control field for requesting a retransmission of said missed user data frame or frames, (B) a field for indicating a second prescribed number of times which represents a number of retransmissions of the missed user

data frame or frames such that the number of retransmissions of the missed user data frame can be dynamically changed between NAK control frames, and (C) a field for indicating a NAK control frame sequence number corresponding to said first prescribed number of times, for duplication check; and transmitting the missed user data frame or frames the second prescribed number of times from the transmitting station to the receiving station, when said NAK control frame is received by the first prescribed number of times.

Claims Text - CLTX (27):

27. A negative acknowledgment (NAK) control frame for a communication system configured to allow a number of retransmissions of RLP data frames to be dynamically modified as compared to a previous NAK control frame, comprising: a sequence field to indicate a data frame sequence number; a control field to indicate a request for retransmission of missed user data; a first field to indicate a first frame of missed data to be retransmitted; a last field to indicate a last frame of missed data to be retransmitted; a negative acknowledgment sequence number field to determine if the missed data has already been retransmitted according to a previous NAK control frame; and a retransmission number to indicate a number of retransmissions of the missed user data frame.